

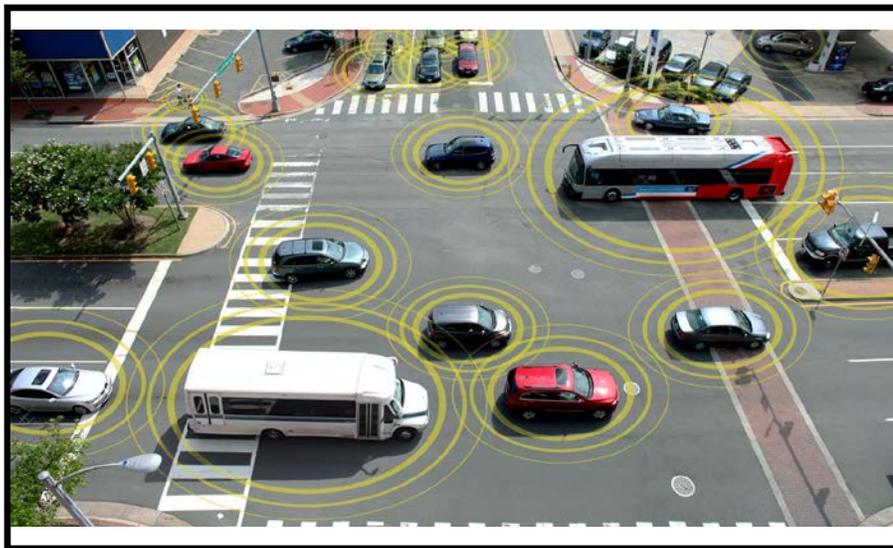
USDOT Guidance Summary for Connected Vehicle Deployments

Participant Training and Stakeholder Education

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16. Abstract <p>This document provides guidance material in regards to the Participant Training and Stakeholder Education Plan for the CV Pilots Deployment Concept Development Phase. The guidance provides key requirements and references in developing the training plan in Task 9, lists relevant deliverables and the relevant elements in each deliverable, identifies key challenges that site deployers may encounter with respect to Task 9, and summarizes the technical support events provided by the USDOT.</p> <p>This document does not replace or alter the work statement defined in the Broad Agency Announcement (BAA); rather it provides technical guidance to the pilot deployers in completing the tasks and deliverables described in the statement of work.</p>					
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1 Introduction

1.1 Purpose of the Report

The purpose of this report is to assist Pilot Deployers in the timely and successful completion of Pilot Deployment deliverables, specifically in the task of developing a training and education plan for pilot participants and stakeholders. As stated in the Broad Agency Announcement:

The Participant Training Plan shall identify the roles that participants will take during the pilot deployment, including a rough description of their activities and responsibilities, and likely training requirements needed to ensure as-planned execution of the pilot deployment in the operational phase.

This report covers elements that should be included in your training plan as well as addresses key challenges that may arise. Note: This document does not replace or alter the work statement defined in the Broad Agency Announcement, it only provides technical assistance to the pilot deployers in completing the tasks and deliverables described in the statement of work.

1.2 Organization of the Report

This report contains four additional sections and a reference section. Section 2 provides the importance of having a training plan in place, the stakeholders who benefit from it, and the key areas that should be included in it. Section 3 walks through the relevant deliverables and how each task relates to training for a successful draft and final *Participant Training and Stakeholder Education Plan*. Section 4 summarizes the key challenges that may arise during the execution of training during the CV pilots, including methods that can be used to overcome them. Section 5 provides a summary of USDOT sponsored technical support. Finally, the Reference section is broken down into documents used in drafting this report and for further training and education guidance.

2 Background

While the connected vehicle technology is revolutionary, it still requires human intervention for all decision making purposes. Whether they are behind the wheel or working in a TMC, the participants of the pilots will play a significant role in determining their success. As these pilots will be the initial deployments of connected vehicle technology in a real-world setting, there will be a great deal of training needed for the proper execution of the newly implemented systems. It is the site's responsibility to prepare personnel for the Maintain/Operate Phase in accordance with an education and training plan that outlines the various roles and responsibilities of personnel to ensure that they perform to the desired standards. A few fundamental concepts that should be included in your training plan are briefly discussed below.

2.1 Identifying Education and Training Groups

As the first step, stakeholder profiling should be performed to gauge the level of responsibility for those involved with the pilot deployment. This will help classify which stakeholder groups need to be kept informed and which groups require more formal instruction. The Stakeholder Registry developed under Task 1 that identifies each stakeholder by organization and role will provide a good working-list for this step. As written in the Broad Agency Agreement, a pilot deployment *partner* refers to an organization or individual on the Contractor's team, and a *stakeholder* refers to an organization or individual potentially impacted by the Pilot Deployment itself, regardless of whether they are team members (partners) or not.

Stakeholders can generally be categorized into three broad groups: the participants, the instructors and the general public.

- The participants are those who are directly involved with the operations of the systems, including agencies, operations/maintenance staff, equipped drivers and equipped pedestrians.
- The instructors are those who will be training the participants for their roles.
- The general public refers to all general travelers in the test area.

The figure below depicts the gradation of the various stakeholder groups.

Figure 2-1: Stakeholder groups (Source: Noblis, 2015)

2.2 Defining the Roles of Stakeholder and Participant Groups

Once the stakeholder groups requiring education or training have been identified, the various roles, responsibilities, and activities should be outlined for each group. The Participant Training and Stakeholder Education Plan must account for all stakeholder groups requiring education or training elements. For those requiring training (e.g. drivers, operations/maintenance staff), the Plan should provide a sense of the tasks they are to perform in the pilot and to whom they would be reporting to. For the stakeholder groups not requiring training (e.g. agencies), the Plan should describe the planned engagement methods and what information they will need to be presented with.

2.3 Educating Stakeholders

Stakeholder engagement provides a foundation for attaining and sustaining the support of stakeholders in the pilot. Engagement activity will serve to educate the stakeholders of what is coming and will garner their interest in participating in the pilot and for the continuation of the project thereafter. Stakeholders targeted through this initial educational activity may include private companies contributing to the project, state and local governments, transit agencies, commercial vehicle operators, emergency medical agencies, freight shippers, or parking facilities associated with the test area. The Training Plan should touch on the methods that will be pursued to educate these groups on the scope and goals of the pilot in order to motivate them to adopt the pilot concept. Stakeholders will also be presented with information regarding the deployment's schedule in order to consider their availability for involvement in the project. Keeping stakeholders in the loop is vital as it facilitates cooperation and concurrence during the pilot.

Note that this educational activity relates specifically to those stakeholders that will potentially have direct involvement in the pilots, while members of the general public surrounding the test area will be able to stay informed through the pilot outreach activities that fall under Task 11.

2.4 Recruiting Prospective Participants

Attracting participants that fit the needed characteristics and experiences is a pre-requisite for a successful operational phase. The target participant groups needed for the study will be dependent on the site-tailored collections of applications being deployed. Pilot studies may incorporate a “before and after” approach or may employ “treatment” and “control” groups for simultaneous evaluation. In the latter, in addition to the drivers that are exposed to the application being tested, an unexposed control group will need to be recruited to serve as the baseline measure.

Target participant groups should be recruited through appropriate mediums. It is advised to recruit needed motorists from the general public through indirect measures. Various techniques can be employed to recruit participants from the general public, including, but not limited to

- Word of mouth;
- Print advertisements;
- Electronic newsletters;
- Social media;
- Cold calls

The interest of motorists of public and commercial vehicles can be gained through direct contact with their agencies.

2.4.1 Participant Qualifications

At a minimum, participants operating vehicles must have a valid driver’s license for the type of vehicle they will be operating (e.g. truck, motorcycle), should be in reasonably good health and should uphold a good driving record. Additional participant requirements are contingent of the site deployers.

2.4.2 IRB Approval and Driver Consent

IRB Approval and driver consent are considered training components since they pertain to participant readiness. Prior to participant recruitment, IRB certification must be in place. As part of the IRB approval (Task 8), the participant recruitment approach and process will be detailed in the IRB application. Once IRB approval is received, pilot Contractors will be responsible for obtaining consent from all participants that would, or may operate the equipped vehicles or applications. A different consent form should be prepared for each participant-type. The consent form will outline the parameters associated with their participation in the pilot, including the data that would be collected, how it would be used, and measures that will be put forth to protect the data. Prospective participants should be issued the consent form upfront during registration for review of what they are agreeing to through their participation in the study. All participants will then be asked to sign the consent form prior to the beginning of the training.

2.5 Training Participants

The Contractor shall design training programs that convey to the participants the roles and responsibilities for their participation in the pilot. The training plan will describe the Contractors approach to training all stakeholders and how the Contractor team will carry out the training. All training must be in compliance with applicable local/State laws and with safety as the forefront.

Different approaches will need to be taken to train system users (vehicle drivers, pedestrians) and system managers/staff (TMC operators, field workers, technicians, etc.), with the latter requiring a more hands-on approach. If the Contractor team includes local/State/transit agencies, the overall training plan should be developed in consultation with the heads of the agencies. If a Contractor team includes private companies (e.g., trucking firms, taxi/limousine service), then the participant training should be coordinated with the appropriate office/manager within the company. It is encouraged that the training be conducted in a manner that involves active participation from the trainees. This can be accomplished through in-person instructional clinics, live demonstrations and test drives.

The training plan should also outline the training curriculum and any supplementary materials that will be used to enhance the curriculum. Take-home supplementary materials are highly encouraged as they can be used for later reference by the participants. Specifics pertaining to the curriculum and supplementary materials will be left entirely to the discretion of the Contractors since training at each site will require different discipline. However, the general nature of the training necessary for each participant type is described below:

Instructors: Systems' experts and curriculum developers will provide the instructors with the information and training needed to deliver the required level of training to all types of Pilot participants. The trainers should be equipped with additional instruction related to adult learning to ensure knowledge retention, including how to engage a variety of learning styles and how to keep a positive learning environment.

Drivers/Pedestrians: Drivers and pedestrians will need to be given background information on the USDOT's connected vehicle initiative and how the technology works. The bulk of instruction for equipped drivers and pedestrians will involve introducing them to the functions of the applications being implemented and the range of the corresponding DVIs or alerts that will elicit their response. Non-equipped drivers and pedestrians serving as a control group may also require basic training for their roles.

Operational Staff: Technicians will need to be trained on installation, operations, and maintenance; and will need to know how to troubleshoot malfunctioning systems brought in throughout the pilot period. Maintenance staff will need to be equipped with a response plan that provides guidance on when to intervene and what actions to take to mitigate risk.

When preparing the training plan, all Contractors are encouraged to check out the ITS JPO's Professional Capacity Building (PCB) Program website that provides free training, technical assistance, and educational assistance for the ITS workforce, with an ever-increasing amount of material targeted at the connected vehicle workforce. The link to the PCB home page is provided here: <https://www.pcb.its.dot.gov/>. The PCB Program also offers several free, 90-minute Talking Transportation Technology (T3) webinars on topics related to connected vehicles. These webinars are a good source for familiarizing stakeholders with the technology, with notable webinars on *Connected Vehicle Basics* (April 24, 2014) and the *Connected Vehicle Workforce* (September 10, 2015). All webinars can be found on the PCB home page or accessed directly at https://www.pcb.its.dot.gov/t3_archives.aspx.

2.6 Evaluating Participant Training

Participants cannot be considered fully trained without first exhibiting their gained knowledge. In order to ensure training efficacy, the training should include assessments throughout the training period or at the conclusion of training. Following the completion of training, trainees should also complete evaluations of the training they received to improve how training is conducted in the future.

During the testing period, it is advised that adequate vendor and agency training and coaching support is available at dispatch and to the operators to make sure that their training has been successful and that they can master the new system's functionality.

3 Relevant Deliverables

This section describes each individual deliverable by task as explained in the CV Pilots Broad Agency Announcement. The Announcement specifically notes that the Training and Education Plan must be consistent with the outcomes and plans associated with both the Human Use Approval Plan (Task 8) and also the Safety Management Plan (Task 4). However, elements from other tasks will also influence the training plan for the operational phase. Additionally, training elements may need to be developed for other deliverables in a number of other tasks. Below are each of the tasks that include some dependencies with the training and stakeholder education task.

3.1 Task 9: Participant Training and Stakeholder Education Plan

The main deliverable that will benefit most from the guidelines in this report is the Participant Training and Stakeholder Education Plan. Before the tested pilot deployment applications and technologies are placed into operational practice, the users and stakeholders must be educated and trained on how to operate the technologies. Under Task 9, the Contractor is requested to develop a high-level plan for the recruitment and training of all personnel participating in the pilot deployment. The Contractor must identify the training needs for all stakeholders actively/directly participating in the Pilot, set the training objectives, and finally design a training program to then implement. The training plan should also discuss training logistics, including the location where the training will occur and the equipping of the training center.

3.2 Task 1: Program Management

The Program Management Plan describes the activities required to perform the work described in all identified Concept Development task areas. The Project Management Plan will include a Stakeholder Registry containing all the information about project stakeholders. This registry can be parsed in the early on stages of training to decide what stakeholder and participant groups need to be considered for training and what groups need to be considered for education purposes.

3.3 Task 4: Safety Management Plan

The Safety Management Plan will describe the underlying needs associated with the safety of all travelers, subjects and other personnel associated with the pilot deployments. The Safety Management Plan will outline actions and counteractions that need to be taken in certain situations to mitigate safety risks. These responsibilities assumed under the Safety Management roles will need to be addressed in the training plan.

3.4 Task 5: Performance Measurement and Evaluation Support Plan

The Performance Measurement and Evaluation Support Plan will ensure quantitative performance measurement against identified targets. *Participant Action Logs* will be utilized to strengthen the linkage between actions taken and changes in measured performance in the transportation system. A proposed protocol for recording actions for the *Participant Action Logs* should be included in the training for the system managers and system users.

3.5 Task 7: Application Development Plan

The Application Development Plan will describe additional functionality and/or performance elements required to develop, tailor and integrate the selected connected vehicle applications for use in the Pilot Deployment. The functionality of the applications being deployed at each site will significantly dictate the required use by the participants and thus the types of training they will require.

3.6 Task 8: Human Use Approval

Approval by the Institutional Review Board (IRB) is required in order to have human participation in the pilot deployments. Under this task, Contractors will complete the application for IRB approval and will actively monitor the approval process. The Human Use Approval task influences training since IRB clearance serves as a pre-requisite for training.

3.7 Task 10: Partnership Coordination

This task is intended to codify and provide definitive documentation of stakeholder agreement on concept, objectives, institutional and financial arrangements necessary for the successful deployment and operation of the pilot deployment. Some of the Contractor partners may directly participate in the Pilot testing and would be subject to the recruitment and training as they are not partners actively participating in the Pilot.

3.8 Task 11: Outreach Plan

The Outreach Plan covers all outreach activities and the accommodation of requests for site visits by media, researchers, and others. Travelers traveling through the test area could either be the recruited participants or the general public. The latter stakeholder group may not be included in the training plan but will be educated through outreach activities and material targeted at a more general audience.

3.9 Task 12: Comprehensive Pilot Deployment Plan

The final Comprehensive Pilot Deployment plan is the culmination of the material prepared from tasks 2-11. All needs pertaining to participant training and stakeholder education must be adequately addressed in this task.

4 Key Challenges

This section discusses several challenges to consider when designing a training plan.

4.1 IRB Requirement

All research dealing with human subjects must be approved by the Institutional Review Board (IRB). The IRB certification must be in place prior to any recruitment activity for participants. The application process often entails multiple applications and amendments to the applications so it is advised that stakeholders begin the certification process as soon as possible.

4.2 Participant Characteristics

Each deployment will call for certain participant groups. Participants with certain characteristics will be needed (e.g. possession of specific types of licenses, visually impaired in the case of PED-SIG, etc.) Some participant types will be harder to recruit than others. It is suggested that Contractors recruit directly through medias specific to the participants they are seeking (e.g. commercial agencies, vision centers).

4.3 Planning and Coordination of Training

The scope of those requiring instruction will likely be rather large. This will require a great deal of planning and coordination to accommodate the maximum number of people using the fewest resources. Training logistics (location, resources needed, if any roads will need to be closed, signage, etc.) will need to be considered in the training plan. Training groups should be surveyed to figure out their availability for consideration in when to offer training sessions. Additionally, multiple training sessions should be offered if possible to ensure that all trainees are able to attend.

4.4 Participant Turnover

Participant dropout is a particular problem for projects with long study periods. When participants dropout, new participants must be recruited and trained to fill their spot, consuming time and resources. It is important to include a retention strategy in the training plan to ensure participant turnover is at a minimum. Occasional check-ins with participants should be utilized to make them feel valued. Another possible method is to provide participants with incremental incentives as the project progresses.

5 Technical Support Summary

A series of USDOT-sponsored webinars were developed to assist early deployers of connected vehicle technologies with Concept Development activities. The webinar described below provides support for the development of a Participant Training and Stakeholder Education Plan.

1. ***Preparing a Participant Training and Stakeholder Education Plan for Connected Vehicle Deployments***

This webinar presents the USDOT perspective on the development of a Participant Training and Stakeholder Education Plan, a key step in the concept development phase for deployment planning. Kate Hartman of ITS JPO describes the concept and the requirements of a Participant Training and Stakeholder Education Plan, which is consistent with the outcomes and plans associated with both the Human Use Approval Plan and Safety Management Plan. This plan identifies the roles that participants will take during the pilot deployment, including a rough description of their activities and responsibilities, and likely training requirements needed to ensure as-planned execution of the pilot deployment in the operational phase.

To access the presentation slides and audio recording for this webinar, please visit the technical assistance page of the CV Pilots website:

http://www.its.dot.gov/pilots/technical_assistance_events.htm.

Appendix: List of Acronyms

Table A-1: List of Acronyms

Acronym	Meaning
BAA	Broad Agency Announcement
CVRIA	Connected Vehicle Reference Implementation Architecture
DOT	Department of Transportation
IRB	Institutional Review Board
ITS	Intelligent Transportation Systems
JPO	Joint Program Office
PCB	Professional Capacity Building
PED-SIG	Mobile Accessible Pedestrian Signal System
SET-IT	System Engineering Tool for Intelligent Transportation
TMC	Transportation Management Center
USDOT	U.S. Department of Transportation

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